1. A method for equalizing a channel in a multiple carrier communication system, the channel being configured to receive a signal and including a spectrally constrained impulse shortening filter, the method comprising:

measuring received noise power spectral density;

computing a target spectral response based on the measured noise power;

selecting a frequency response of the spectrally constrained impulse shortening filter based on the target spectral response; and

filtering the communication signal with the spectrally constrained impulse shortening filter.

2. The method of claim 1, wherein the communication system includes a discrete Fourier transform and the noise power spectral density is measured at an output of the discrete Fourier transform.

3. The method of claim 1, wherein the communication system includes a discrete cosine transform and the noise power spectral density is measured at an output of the discrete cosine transform.

4. The method of claim 1, wherein the spectrally constrained impulse shortening filter is a time domain digital filter.

5. A method for selecting an impulse response for a spectrally constrained impulse shortening filter in a multiple carrier communication system, the method comprising:

measuring received noise power spectral density;

computing a cost function using the noise power, the cost function being dependent on the impulse response;

reducing the dimensionality of a space over which the cost function is defined; and

minimizing the cost function.

6. The method of claim 5, wherein the communication system includes a discrete Fourier transform and the noise power spectral density is measured at an output of the discrete Fourier transform.

7. The method of claim 5, wherein the cost function is used to compute coefficients for the spectrally constrained impulse shortening filter.

8. A method for equalizing a channel in a multiple carrier communication system, the channel having an impulse response and being configured to receive a signal having a cyclic prefix, the method comprising:

computing a target spectral response;

shortening the impulse response of the channel so that a significant part of an energy of the impulse response is confined to a region that is shorter than a target length; and

filtering the signal based on the target spectral response.

9. The method of claim 8, wherein the target length is a length of the cyclic prefix.

10. The method of claim 8, wherein the target spectral response is computed using measured noise power density.

11. The method of claim 10, wherein the communication system includes a discrete Fourier transform

and the noise power spectral density is measured at an output of the discrete Fourier transform.

12. The method of claim 10, wherein the target spectral response is the inverse of the measured noise power spectral density.

13. The method of claim 8, wherein the filtering step is performed with a filter having a frequency response selected to match the target spectral response.

14. The method of claim 8, wherein the shortening of the impulse response is performed by a time domain digital filter.

15. The method of claim 8, wherein the filtering is performed by a time domain digital filter.

16. The method of claim 8, wherein the shortening of the impulse response and the filtering are performed by a time domain digital filter.

17. A spectrally constrained impulse shortening filter for a multiple carrier communication system, the system being configured to receive a signal and including a channel that has an impulse response, the filter comprising:

an input connected to receive the signal;

a digital filter structure configured to apply a frequency characteristic to the signal, the frequency characteristic being determined by filter coefficients; and

taps connected to receive the filter coefficients,

wherein the coefficients are selected to shorten the impulse response of the channel so that a significant part of an energy of the impulse response is confined to a region

that is shorter than a target length and to apply a frequency characteristic to the signal based on a target spectral response.

18. The filter of claim 17, wherein the target length is a length of the cyclic prefix.

19. The filter of claim 17, wherein the target spectral response is computed from measured noise power density.

20. The filter of claim 19, wherein the noise power spectral density is measured at an output of a discrete Fourier transform.

21. The filter of claim 19, wherein the target spectral response is the inverse of the measured noise power spectral density.

22. A receiver for receiving a multiple carrier signal from a communication channel having an impulse response, the receiver comprising:

an analog-to-digital converter connected to receive the signal from the communication channel;

a spectrally constrained impulse shortening filter connected to receive the signal from the analog-to-digital converter and configured to shorten the impulse response of the channel so that a significant part of an energy of the impulse response is confined to a region that is shorter than a target length and to apply a frequency characteristic to the signal based on a target spectral response;

a discrete Fourier transform connected to receive the output of the spectrally constrained impulse shortening filter; and

a decoder connected to receive outputs of the discrete Fourier transform.

23. The receiver of claim 22, wherein the target spectral response is computed from measured noise power density.

24. The receiver of claim 23, wherein the noise power spectral density is measured at an output of a discrete Fourier transform.

25. The receiver of claim 23, wherein the target spectral response is the inverse of the measured noise power spectral density.

26. The receiver of claim 22, wherein the target length is a length of the cyclic prefix.

27. A modem comprising:

an encoder connected to receive digital data and configured to output a constellation of complex values;

an inverse discrete Fourier transform connected to receive the constellation from the encoder;

a digital-to-analog converter connected to the inverse discrete Fourier transform and configured to output a signal to a communication channel;

an analog-to-digital converter configured to receive the signal from the communication channel;

a spectrally constrained impulse shortening filter configured to shorten an impulse response of the channel so that a significant part of an energy of the impulse response is confined to a region that is shorter than a target length and filter the signal based on a target spectral response;

a discrete Fourier transform connected to the filter; and

a decoder connected to the discrete Fourier transform and configured to output digital data.

28. The modem of claim 27, wherein the target spectral response is computed from measured noise power density.

29. The modem of claim 28, wherein the noise power spectral density is measured at an output of the discrete Fourier transform.

30. The modem of claim 28, wherein the target spectral response is the inverse of the measured noise power spectral density.

31. The modem of claim 27, wherein the target length is a length of the cyclic prefix

32. Software on a processor readable medium comprising instructions for causing a processor in a communication system to perform the following operations:

measure received noise power spectral density; and

compute a target spectral response based on the measured noise power spectral density.

33. The software of claim 32, further comprising instructions for causing a processor in a communication system to compute filter coefficients based on the target spectral response.

34. Software on a processor readable medium comprising instructions for causing a processor in a communication system to perform the following operations:

measure received noise power spectral density;

compute a cost function using the noise power, the cost function being dependent on an impulse response of a spectrally constrained impulse shortening filter;

reduce the dimensionality of a space over which the cost function is defined; and

minimize the cost function.

35. The software of claim 34, wherein the cost function is used to compute coefficients for the filter.